WHAT IS CLAIMED IS:

1. An optical source generator for wavelength division multiplexing optical communication systems, comprising:

a first and a second pumping light generator that generate and output pumping lights having a particular wavelength;

a first wavelength router that wavelength-division-demultiplexes and outputs the pumping lights output from the first and second pumping light generator;

a first plurality of optical fiber amplifiers that generate spontaneous emissions from the pumping lights output by a first port section of the first wavelength router, and output the generated spontaneous emissions as optical signals;

a second plurality of optical fiber amplifiers that generate spontaneous emissions from the pumping lights output by a second port section of the first wavelength router, and output the generated spontaneous emissions as optical signals;

a second wavelength router that wavelength-division-multiplexes optical signals output by the first and second plurality of optical fiber amplifier s and outputs the wavelength-division-multiplexed optical signals;

a first optical band pass filter for passing through only optical sources having a particular wavelength band of multi-wavelength optical sources output by the second wavelength router and inputting the passed optical sources into the first wavelength router; and

a second optical band pass filter for passing through only optical sources having a

particular wavelength band of multi-wavelength optical sources output by the second wavelength router and inputting the passed optical sources into the first wavelength router,

wherein first optical sources are generated through first optical paths which direct in an input direction of the pumping lights inputted from the first pumping light generator, second optical sources being generated through second optical paths which direct in an input direction of the pumping lights inputted from the second pumping light generator.

2. The optical source generator according to claim 1, wherein the first wavelength router comprises the first and the second port section each of which comprises:

a multiplexing port, wherein the pumping lights output by the first pumping light generator are input into the multiplexing port of the first port section and the pumping lights output by the second pumping light generator are input into the multiplexing port of the second port section, and

a plurality of demultiplexing ports that wavelength-division-demultiplex the pumping lights output by the first pumping light generator into the multiplexing port of the first port section and output the wavelength-division-demultiplexed pumping lights to the plurality of demultiplexing ports of the second port section, and wavelength-division-demultiplex the pumping lights output by the second pumping light generator into the multiplexing port of the second port section and output the wavelength-division-demultiplexed pumping lights to the plurality of demultiplexing ports of the first port section.

3. The optical source generator according to claim 2, wherein the second wavelength router comprises a third and fourth port section each of which comprises:

a multiplexing port; and

a plurality of demultiplexing ports,

wherein the optical signals output by the first plurality of optical fiber amplifiers are input into the demultiplexing ports of the third port section and the optical signals output by the second plurality of optical fiber amplifiers are input into the demultiplexing ports of the fourth port section, and

wherein the plurality of demultiplexing ports wavelength-division-multiplex the optical signals output by the first plurality of optical fiber amplifiers into the demultiplexing ports of the third port section and output the wavelength-division-multiplexed optical signals to the multiplexing port of the fourth port section, and wavelength-division-multiplex the optical signals output by the second plurality of optical fiber amplifiers into the demultiplexing ports of the fourth port section and output the wavelength-division-multiplexed optical signals to the multiplexing port of the third port section.

4. The optical source generator according to claim 1, wherein the second wavelength router comprises a third and fourth port section each of which comprises:

a multiplexing port; and

a plurality of demultiplexing ports,

wherein the optical signals output by the first plurality of optical fiber amplifiers are input into the demultiplexing ports of the third port section and the optical signals output by the second plurality of optical fiber amplifiers are input into the demultiplexing ports of the fourth port section, and

wherein the plurality of demultiplexing ports wavelength-division-multiplex the optical signals output by the first plurality of optical fiber amplifiers into the demultiplexing ports of the third port section and output the wavelength-division-multiplexed optical signals to the multiplexing port of the fourth port section, and wavelength-division-multiplex the optical signals output by the second plurality of optical fiber amplifiers into the demultiplexing ports of the fourth port section and output the wavelength-division-multiplexed optical signals to the multiplexing port of the third port section.

5. The optical source generator according to claim 1, wherein:

the first optical band pass filter passes through optical sources output from the multiplexing port of the second port section of the second wavelength router, and inputs the passed optical sources into the multiplexing port of the first port section of the first wavelength router, and

the second optical band pass filter passes through optical sources output from the multiplexing port of the third port section of the second wavelength router, and inputs the passed optical sources into the multiplexing port of the fourth port section of the first wavelength router.

6. The optical source generator according to claim 2, wherein:

the first optical band pass filter passes through optical sources output from the multiplexing port of the second port section of the second wavelength router, and inputs the passed optical sources into the multiplexing port of the first port section of the first wavelength router, and

the second optical band pass filter passes through optical sources output from the multiplexing port of the third port section of the second wavelength router, and inputs the passed optical sources into the multiplexing port of the fourth port section of the first wavelength router.

7. The optical source generator according to claim 3, wherein:

the first optical band pass filter passes through optical sources output from the multiplexing port of the second port section of the second wavelength router, and inputs the passed optical sources into the multiplexing port of the first port section of the first wavelength router, and

the second optical band pass filter passes through optical sources output from the multiplexing port of the third port section of the second wavelength router, and inputs the passed optical sources into the multiplexing port of the fourth port section of the first wavelength router.

8. The optical source generator according to claim 4, wherein:

the first optical band pass filter passes through optical sources output from the multiplexing port of the second port section of the second wavelength router, and inputs the passed optical sources into the multiplexing port of the first port section of the first wavelength router, and

the second optical band pass filter passes through optical sources output from the multiplexing port of the third port section of the second wavelength router, and inputs the passed optical sources into the multiplexing port of the fourth port section of the first wavelength router.

9. The optical source generator according to claim 1, wherein the first and second optical band pass filters pass through optical sources having different wavelength ranges so as to increase the number of optical channels of optical sources by causing the first and second optical sources to generate optical sources the wavelength of which are different from each other.

10. An optical source generator according to claim 9, wherein the first and second optical band pass filter has its passbands separated by a certain free spectral range (FSR).

11. An optical source generator according to claim 1, further comprising optical switches for switching the demultiplexing ports of the first optical paths and the demultiplexing ports of the first optical paths in a one-to-one connection so as to replace some of the first optical sources with some of the second optical sources when some of the first optical sources are operating abnormally.

12. An optical source generator according to claim 11, wherein the first and second optical band pass filter passes through optical sources having same wavelength ranges.

13. An optical source generator for wavelength division multiplexing optical communication systems, comprising:

a first and second pumping light generator for generating and outputting pumping lights having a particular wavelength;

a first wavelength router, comprising a first and second port section each of which comprises a multiplexing port and a plurality of demultiplexing ports, for wavelength-division-demultiplexing the pumping lights inputted from the first pumping light generator into the multiplexing port of the first port section and outputting the wavelength-division-demultiplexed pumping lights to the demultiplexing ports of the second port section, and for wavelength-division-demultiplexing the pumping lights inputted from the second pumping light generator into the multiplexing port of the second port section and outputting

the wavelength-division-demultiplexed pumping lights to the demultiplexing ports of the first port section;

a first plurality of optical fiber amplifiers for generating spontaneous emissions from the pumping lights outputted from the demultiplexing ports of the second port section of the first wavelength router, and outputting the generated spontaneous emissions as optical signals;

a second plurality optical fiber amplifiers for generating spontaneous emissions from the pumping lights outputted from the demultiplexing ports of the first port section of the first wavelength router, and outputting the generated spontaneous emissions as optical signals;

a second wavelength router, comprising a third and fourth port section each of which comprises a multiplexing port and a plurality of demultiplexing ports, for wavelength-division-multiplexing optical signals inputted from the first plurality of optical fiber amplifiers into the demultiplexing ports of the third port section and outputting the wavelength-division-multiplexed optical signals to the multiplexing port of the fourth port section, and for wavelength-division-multiplexing optical signals inputted from the second plurality of optical fiber amplifiers into the demultiplexing ports of the fourth port section and outputting the wavelength-division-multiplexed optical signals to the multiplexing port of the third port section;

a first optical band pass filter for passing through only optical sources having a particular wavelength band of multi-wavelength optical sources outputted from the multiplexing port of the second port section of the second wavelength router, and inputting

the passed optical sources into the multiplexing port of the first port section of the first wavelength router; and

a second optical band pass filter for passing through only optical sources having a particular wavelength band of multi-wavelength optical sources outputted from the multiplexing port of the first port section of the second wavelength router, and inputting the passed optical sources into the multiplexing port of the second port section of the first wavelength router,

wherein first optical sources are generated through first optical paths which direct in an input direction of the pumping lights inputted from the first pumping light generator, second optical sources being generated through second optical paths which direct in an input direction of the pumping lights inputted from the second pumping light generator.

14. An optical source generator according to claim 13, wherein the first and second optical band pass filter passes through optical sources having different wavelength ranges so as to increase the number of optical channels of optical sources by causing the first and second optical sources to generate optical sources the wavelength of which are different from each other.

15. An optical source generator according to claim 14, wherein the first and second optical band pass filter has its passband separated by a certain free spectral range (FSR).

16. An optical source generator according to claim 13, further comprising optical switches for switching the demultiplexing ports of the first optical paths and the demultiplexing ports of the first optical paths in a one-to-one connection so as to replace some of the first optical sources with some of the second optical sources when some of the first optical sources are operating abnormally.

17. An optical source generator according to claim 16, wherein the first and second optical band pass filters pass through optical sources having same wavelength ranges.